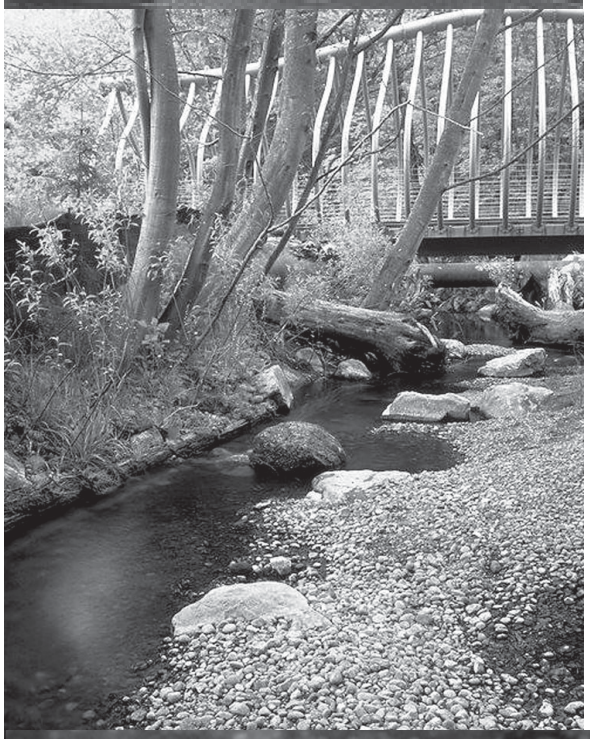
RESTORE OUR WATERS STRATEGY

City of Seattle

September 2004



The Mayor's Restore Our Waters Strategy

Seattle is a city defined by water

Restore Our Waters

WHY A RESTORATION STRATEGY FOR OUR WATERS?

Seattle is a City defined by water. Puget Sound, Lake Washington, Lake Union and the Ship Canal, the Duwamish River, urban creeks and small lakes each enhance the quality of life for the people, fish, birds and other wildlife that live here. The City is currently host to four species of salmon including Chinook salmon, listed as threatened under the Endangered Species Act (ESA). It also hosts resident trout, blue herons, bald eagles and a web of more resilient water dependent species. Seattle's major waterways bustle with water-oriented business and recreational opportunities and support one of the premier industrial seaports on the West Coast. Seattle's aquatic areas also offer important opportunities for residents to enjoy and experience nature close to home.

Over 150 years of urbanization have steadily degraded Seattle's aquatic resources. A six mile stretch of the Duwamish River is a Federal Superfund site. Over 90% of Seattle's 146 miles of shoreline have been modified and lack natural connections to the water. Seattle's urban creeks have seen stormwater flows equivalent to some rivers. Fish in our local waters contain high amounts of mercury and PCB's and some of our coho salmon are dying before they can spawn in Seattle streams. Yet, while they are considered degraded, these aquatic environments have amazing vitality and resilience.

To stem this degradation, over the past 30 years the City of Seattle has made significant investments in protecting and restoring creeks, shorelines and waters within the City, and when appropriate has required developers to do the same. However, the city's dense urban nature makes these efforts both challenging and expensive. Seattle is a major urban center, and consistent with the Growth Management Act the City will have more growth and more density than surrounding areas. Consequently, the City must balance the environmental benefit of concentrating residential, commercial and industrial development in an already dense urban area with the benefit of restoring the City's critical water resources. More challenging is the difficulty and expense of tackling the indirect impacts, such as sormwater runoff, that cumulatively have led to the water pollution, uncontrolled flows, and extensive shoreline and channel modifications that typify the current state of Seattle's waterbodies.

The City needs a coordinated, wide-ranging and science based strategy focused on all of Seattle's aquatic environments. City departments need guidance about where to focus protection and restoration efforts, based upon good science and informed by regulatory requirements, funding availability, community interests and opportunity. The City needs to make decisions that result in the best long-term improvements in the overall health of the aquatic ecosystem and the best return on investment of City funds. The City must also seek to achieve multiple benefits (e.g. environmental, recreational, economic development) and be consistent with tribal treaty obligations.

The City as a government cannot solve all, or even the majority, of the problems confronting creeks, shorelines and waters in Seattle. In fact, the City's ability to protect and restore aquatic resources is narrowly limited to the small percentage of properties it owns and the development activities it regulates. Therefore, it must actively engage private property owners, non-profit organizations, community groups and other government agencies in this effort.

The Mayor is committed to fostering healthier aquatic ecosystems in Seattle by defining long-term aspirations for each unique aquatic area, establishing science-based investment guidelines, and focusing City resources to support three fundamental principles:

- ***Do no further harm***
- ***Restore critical natural functions and highly functional areas; and***
- ***Inspire others to do the same***

Hence the Mayor has set forward this strategy to give more focus and coordination to actions by government and the community to ***Restore Our Waters.***

DEVELOPMENT OF THE "RESTORE OUR WATERS" STRATEGY

In April of 2004 the Mayor issued Executive Order 03-04 requiring inter-departmental review of everything the City does that affects water resources inside the City limits. Twelve City Departments were instructed to develop a shared action plan that would:

- Focus the City's efforts towards achieving what is best for water quality and aquatic habitats inside the City;
- Establish City-wide priorities and a shared framework for investments and best management practices (BMP);
- Develop a long-term framework for departments to work together on matters affecting our waterbodies;
- Streamline and coordinate city policies, regulations, and enforcement;
- Create educational opportunities which inspire others to take protective and restorative actions on behalf of our waterbodies;
- Provide incentives for others to steward, protect and restore these resources;
- Identify methods to leverage City funding of these efforts; and
- Create a mechanism for stakeholder involvement.

The findings from the cross-departmental effort form the foundation of the ***Restore Our Waters Action Agenda,*** which follows. The nine Actions recommended in this strategy are summarized below**.**

ACTION ITEM #1. Establish Long-Term Aspirations for In-City Water Resources.

ACTION ITEM #2. Use Science-Based Guidelines to Direct Citywide Efforts.

ACTION ITEM #3. Establish Clear, Quantifiable Goals and Measures of Progress.

ACTION ITEM #4. Make Strategic Changes to the City's Policy and Regulatory Framework.

ACTION ITEM #5. Move Forward on Priority City Capital Project Investments.

ACTION ITEM #6 . Make Investments to Ensure City Operations Support Improved Aquatic Health.

ACTION ITEM #7. Expand Partnerships with the Community and Private Property Owners to Restore Our Waters.

ACTION ITEM #8. Advance Scientific Understanding and Adaptively Manage City Efforts.

ACTION ITEM #9. Establish a Stakeholder Group to Promote Long-Term Coordination within City Government and Between the Citizens of Seattle.

Appendix 1 provides an Action Plan with timeframes, funding and responsible departments.

ACTION AGENDA TO RESTORE OUR WATERS

ACTION ITEM #1. Establish Long-term Aspirations for In-City Water Resources.

The key to understanding how and where to invest in Seattle's aquatic resources is to clearly articulate aspirations for each waterbody and the investment priorities that follow. Seattle's aquatic environments range from freshwater lakes and creeks to marine shorelines and bays. All are unique in location, attributes, circumstances and the issues that affect them. Not all will require the same level of investment or effort, nor is it desirable or cost effective (from an ecological perspective) to improve all of them to the same degree. Overall, the Mayor's aspirations for aquatic environments in the City are that they be:

Sustainable places that citizens and businesses can utilize, access and have pride in and in which fish and other wildlife can flourish.

Following are the Mayor's aspirations for ten unique aquatic resource areas in Seattle. These aspirations articulate the Mayor's vision for the future condition of each resource. Some goals may not be reachable in our lifetime, but we can still aspire to them.

Duwamish River – The Duwamish has been transformed from a Superfund site and industrial waterway to a vibrant and thriving ecosystem that coexists with resident industries. City and private sector sediment remediation and habitat restoration projects have reclaimed significant areas of inter-tidal and shoreline habitat, allowing wildlife to flourish along stretches of the river and providing areas of valuable public access. These areas are successfully intertwined with the City's maritime and industrial firms, and enhance their properties. Businesses and residents view the Duwamish as a vibrant and complex ecosystem, and they guard against renewed contamination and water pollution.

Puget Sound Shoreline – The City, working with shoreline businesses and residents, has successfully restored shallow water habitat and shoreline refuge areas for resident and migrating fish and birds. Water from City's outfalls meets or exceeds State and Federal water quality standards. Bluff erosion provides a natural source of sand and gravel needed to maintain beach habitat.

Chittenden Locks/Ship Canal/Lake Union/Portage Bay – This area of the City remains a vital center for Seattle's water-dependent maritime industrial base, and still serves as the home base of the North Pacific Fishing fleet. While still used intensively for industry, the water quality of this resource area has greatly improved. The City in collaboration with local industries has restored significant areas of shallow water and shoreline habitat for migrating fish and birds, while balancing the needs of industrial businesses in the area. An area habitat plan allows development-required mitigation efforts to effectively contribute to these shore-edge refuge areas and public access points within this major transportation and marine industrial corridor. Sediment contamination and Combined Sewer Overflow (CSO) related water pollution has been adequately addressed, and water quality is sufficient to encourage public recreational uses. A more gradual saltwater/fresh water transition at the western end of the corridor, and cooler summer water temperatures make the waters more hospitable to aquatic life.

Lake Washington/Union Bay – Lake Washington remains a regional recreational resource, and the City, in collaboration with private property owners, has made significant and effective investments to improve shoreline edge habitat. Water quality is improved and pollution from marinas, contaminated sites, storm drains and CSOs is significantly reduced. Shorelines and shallow water habitats are strategically restored and re-vegetated. Docks are retrofitted to decrease interference with key refuge and rearing habitat for migrating salmon.

Thornton Creek – Creekside landowners have worked in concert with the City to make the largest and least publicly owned creek Seattle's most productive. Habitat damaging flows of stormwater entering the creek have been controlled. Overall water quality has been improved and specific conditions at Matthews Beach addressed. Coho pre-spawn mortality is reduced. Fish passage barriers have been sequentially removed and local residents, in collaboration with the City, have made improvements in habitat conditions in areas where flows and channel conditions can adequately support aquatic life.

Taylor Creek – Citizens value this creek as the City's most pristine in-city watershed. Fish passage barriers in the lower reaches of the creek have been sequentially removed and conditions at the mouth improved to make the creek a healthy home and refuge area for migrating juvenile salmon. Surrounding development in the upstream unincorporated area has been designed to limit stormwater flows and protect water quality in the creek. Overall water quality is improved.

Pipers Creek – The community regards this creek as a vital centerpiece of Carkeek Park and the Greenwood and Broadview communities. City investments in natural drainage systems and other techniques have reduced high impact creek flows. Water quality is improved. Salmon have access to the lower reaches of the creek. Coho pre-spawn mortality is reduced. Reforestation efforts sustain the integrity of this ecosystem.

Longfellow Creek – The Delridge community enjoys this creek and it is viewed as a legacy and an asset. Salmon populations are thriving and have access to key habitats within and above the golf course. Flows are controlled to support a diversity of species. Impacts from CSO's, septic tanks and stormwater runoff are minimized and water quality is improved. Coho pre-spawn mortality is reduced.

Fauntleroy Creek/Smaller Creek Systems – These smaller creeks are highly functional wildlife corridors. Residential property owners and the community have been assisted by the City in their efforts to slow flows, limit water quality pollution, reforest creek buffers and, where valuable, reconnect creek mouths to shoreline areas.

Green, Bitter and Haller Lakes – Green Lake continues to be one of the City's premier recreation areas and is consistently fishable and healthy for swimmers and wildlife. Water quality in all in-land lakes has been improved and native vegetation at the lakes' edges are adequate to support a healthy and diverse population of bird and aquatic species.

ACTION ITEM #2. Use Science-Based Guidelines to Direct Citywide Efforts.

To achieve the foregoing aspirations, the City must take a long-term view of how to best restore the health of each area. A centerpiece of this strategy is a set of science-based guidelines for prioritization, sequencing, and coordination of all City of Seattle efforts. (Table 1 below). These guidelines reflect the condition and weigh the importance of critical limiting factors in creek, lake and shoreline areas. Detailed information about current conditions was compiled by City staff and is provided in Appendix 2 - Summary of Current Conditions and Critical Limiting factors. These guidelines are intended to ensure greater scientific rigor and uniformity in department decision making related to aquatic environments.

Table 1
Science Based Investment Guidelines

Puget Sound/Duwamish/Lake Washington/Lake Union/Ship Canal Shorelines	
Highest Priority	• ***Re-establish critical habitats.*** Create a physical chain of naturalized (restored & revegetated) refuge areas giving highest priority to: a) large contiguous areas; b) areas adjacent to available habitat; and c) critical gaps. • ***Control water quality and remove contaminated sediments*** in regulated areas and proximate to habitat refuge areas and public contact recreation points**.**
Medium Priority *	• Remediate contaminated sediments in non-refuge and non-public contact recreation sites.
Lower Priority *	• Revegetate 'non-refuge' shoreline areas with native plants.
Creeks	
Highest Priority	• ***Reduce high impact creek flows.*** Give highest priority to reducing runoff in areas that: a) deliver the largest volumes of stormwater runoff to creeks; b) discharge runoff the fastest; and c) impact the longest downstream portions of the creek. • ***Facilitate improvements in existing channel capacity/hydrologic conditions*** giving highest priority to: a) large areas with fast water; b) areas with available floodplain; and c) creek sections that represent critical gaps in low flow velocity refuges. • ***Address water quality issues for humans and aquatic health***.
Medium Priority *	• Facilitate sequential removal of fish passage barriers (and grade controls).
Lower Priority *	• Establish complex in-stream and riparian habitat structure.
In-land Lakes	
Highest Priority	• ***Address water quality issues that could impact human health.***
Medium Priority*	• Address other water quality issues.
Lower Priority *	• Revegetate shorelines and enhance habitat diversity.

*Designating an activity as "medium" or "lower" priority does not imply that it is unimportant, it means only that these are areas where the **City's** investments (vs. property owner investments) should be limited to smaller, more community based and opportunistic increments **until** higher priority issues for a specific area are addressed.

These are guidelines that will establish the scientific value of a City action or investment in water resource protection and restoration. The City may then choose to weight (or balance) a particular effort with other considerations such as: opportunity, cost-benefit, lifecycle cost, community interest, practicality, legal requirements, potential adverse impacts on industrial businesses, and other City policy objectives.

ACTION ITEM #3. Establish Clear, Quantifiable Goals and Measures of Progress.

While the Mayor's fundamental principles, the resource area aspirations, and the science-based investment guidelines above provide an overarching focus for City efforts, establishing quantifiable goals and measures of progress (perhaps akin to Seattle's goal of recycling 60% by 2010) will provide something more tangible to achieve. As part of the Restore Our Waters strategy, the City will work with scientists and economists over the next several years to develop reasonable and quantifiable goals for Seattle's water resources overall and (if desirable) for specific resource areas.

In addition to this, the City will continue to work to better monitor baseline conditions and trends (upwards and downwards) in Seattle's efforts related to aquatic environments focusing on the areas outlined below.

- Improvements in Water Quality
- Reductions in High Impact Creek Flows
- Increases in Critical Habitat (Connectivity and Complexity)
- Increases in Public Private Partnerships
- Increases in the City's Leveraging of Financial Resources

The City will issue a State of the Waters report biennially (or as needed) compiling findings from these efforts. See Appendix 3 for a detailed description of monitoring strategies and commitments.

ACTION ITEM #4. Make Strategic Changes to the City's Policy and Regulatory Framework.

City plans, policies, regulations and regulatory requirements related to aquatic environments are numerous and substantial. (See Appendix 4) The City's land use and stormwater policies and regulations are essential in efforts to improve the quality of Seattle's water resources. These policies and regulations need to be updated to reflect the most current thinking on protecting water resources. Additionally, where ambiguities and conflicts exist between these and other City policies and regulations, the City must take proactive steps to strategically balance and reconcile them. The Mayor is recommending that the following City policies and regulations be modified to better protect water resources within the City, and to clearly articulate the value the citizens of Seattle place on their in-city water resources.

A. Formalize the resource specific aspirations and science based guidelines to guide City efforts in aquatic environments. Articulate by Executive Order, Council Resolution and/or future amendments to the Comprehensive GMA plan. See further descriptions in Action Item 1 and 2.

B. Advance the Restore Our Waters strategy by making strategic changes in major Regulatory Updates.

- 2004 Comprehensive Plan Update and Annual Amendments – establish policies articulating the City's interest and intent in protecting and enhancing aquatic areas.
- 2004 Environmentally Critical Areas Regulations Legislation – better identify and protect Seattle riparian environments, wetlands, and areas where development of impervious surfaces increases runoff and the potential for pollutants to enter waterbodies.
- 2004 Comprehensive Drainage Plan Update – advance the City's objectives in reducing stormwater runoff impacts on creeks as well as addressing stormwater pollution in creeks and receiving water bodies.
*- 2**005 Stormwater, Grading and Drainage Code Amendments*** – identify options to increase flow and water quality related controls in creek drainages and encourage stormwater related retrofits of existing developments.
- 2005-6 Comprehensive Wastewater Plan– evaluate and set priorities related to wastewater system impacts on aquatic resources.
- 2009 Shoreline Master Program Update – revise and enhance policies protecting and restoring shoreline habitat and public access areas.

C. Establish regulatory frameworks to increase the effectiveness of required mitigation in our industrial areas.

- Frameworks for Shoreline Mitigation Banking - As part of the Mayor's Maritime Action Strategy, centralize mitigation efforts to allow for more concentrated mitigation while lessening the impact and burden on industrial businesses. Identify high priority habitat refuge and public access opportunity sites within heavily developed shoreline areas (e.g. Lake Union/Ship Canal), that will not displace active industrial businesses. Allow private developers to contribute to a mitigation bank, rather than requiring them to offset the impact of new development on site.

- *Framework for Duwamish River Habitat Restoration* – Develop a blueprint or other mechanisms (e.g. zoning overlay) for ensuring successful integration of Natural Resource Damage Assessment (NRDA) related habitat restoration work within the Duwamish industrial area.

D. Reconcile ambiguities and conflicts in City policies and regulations. Establish a forum and process to resolve issues and better integrate policy and management practices that benefit aquatic environments into City operations. Focus to include but not be limited to:

- Making street standards consistent with natural drainage system design specifications.
- Balancing street end permitting/policies with habitat restoration, public access policy objectives, and the needs of industrial businesses in the ship canal.
- Balancing shoreline area parking permitting/policies with water quality objectives.
- Balancing support of water dependent businesses and recreational uses with restoration of aquatic habitats.
- Establishing a policy that identifies protection of aquatic environments and other ecologically sensitive areas as a priority use for City properties and ensures that this value is considered when purchasing new property or disposing of surplus property.
- Establishing a process for sanctioning official City maps and reconciling/resolving disputes over wetland identification, ditches vs. creeks, piped storm drains vs. regulated riparian corridors, etc.

E. Provide Uniform Planning and Compliance Review for City Projects. Set standard procedures for departmental planning and regulatory review of City projects that have the potential to impact aquatic environments, to ensure the City is a leader in implementing City Shoreline, ECA, and Stormwater Code requirements.

F. Target Code Enforcement. Assess existing enforcement activities and develop a strategy to tighten and more strategically target enforcement of existing codes.

ACTION ITEM #5. Move Forward on Priority City Capital Project Investments.

The Mayor's strategy identifies 40 priority capital investments for the City to make in restoring Seattle's creeks and shorelines over the next 10 years. These priority investments are based upon scientific guidelines in Table 1 (see action item #2) and, as a result, focus primarily upon improving water quality, slowing high impact creek flows, and restoring critical shoreline habitats. Some of the projects affirm work that is already underway. Others represent new projects identified here as a priority for future funding.

Appendix 5 provides a detailed listing and map of all 40 priority capital projects by resource area. These investments include but are not limited to the following:

- **Seven water quality improvement projects** targeting Lake Washington, Lake Union, Puget Sound, and the City's inland lakes will make Seattle's waters more hospitable to fish and other aquatic organisms, and provide the citizens of Seattle with cleaner lake, creeks, and marine waters.

- **Two major sediment remediation projects** for the Duwamish River and Gasworks Park, will remove hazardous materials from lake and river sediment.

- **Four natural drainage system projects** (Longfellow, Pipers, and Thornton Creek) will provide neighborhoods with flood control and dramatically reduce destructive high flows in these creeks.

- **Comprehensive flow control strategies** (assessing natural drainage systems, detention ponds, by-pass options, etc) to reduce flows in high impact drainages on Longfellow, Pipers, Taylor, Thornton Creeks.

- **Studies to assess and facilitate channel widening efforts** on targeted sections of Fauntleroy, Longfellow, Pipers, Taylor and Thornton Creeks

- **Fourteen shoreline habitat restoration projects** along Lake Washington, Lake Union, the Ship Canal, and Puget Sound to improve habitat opportunities for migrating chinook salmon, shoreline habitat for birds, other wildlife, and public access for people.

- **Green Seattle Initiative riparian reforestation projects** on creeks and key shorelines.

The City will continue to pursue numerous other projects (in addition to those listed above) that will also have direct or indirect positive affects on water resources in Seattle.

ACTION ITEM #6. Make Investments to Ensure City Operations Support Improved Aquatic Health.

The Mayor's strategy proposes to better focus the City's operational efforts to restore our waters by initiating targeted, pilot evaluations of water quality best management practices (BMP's) for the City's highest impact activities. Priority pilot projects being recommended include the following:

A. **Targeted street sweeping and catch basin cleaning** efforts on key roadways.

B. **Two fecal coliform control pilots**, one that provides bags and receptacles for pet waste collection at waterside Parks (outside of off-leash areas) and a second to address fecal sources at Matthews Beach.

C. **Strategic maintenance of targeted CSO and drainage infrastructure**.

D. **A pesticide use, turf health and water quality monitoring** program for select areas at creekside golf courses.

E. **Enhanced training for City workers on construction management related stormwater practices**.

Spill response, compliance auditing/corrections and hazardous materials use have been identified as a second tier of areas where improved City BMP procedures would benefit Seattle's water resources.

ACTION ITEM #7. Expand Partnerships with the Community and Private Property Owners to Restore Our Waters.

The actions of private property owners and community groups in our developed urban environment are key to successful restoration of degraded resources. The City can educate people about the negative effects of everyday activities and simultaneously encourage them to take positive actions to restore the environment. Removing regulatory disincentives and providing financial incentives are a tool the City can use to build partnerships with these groups, while at the same time achieving direct and measurable benefits to the City. Incentives provided by the City must also achieve a broader public benefit. In addition, they must also be accessible and be perceived as offering a 'good deal' or 'fair value' to potential recipients. Incentives can be large or small and can range from pre-approved plans and property tax reductions to plant vouchers and rain barrel discounts.

The Mayor's strategy recommends development and expansion of the following ***education and stewardship*** programs to assure that citizens and businesses can do their part in restoring our waters.

A. Citizen Science Program. Under the guidance of the Seattle Aquarium citizens are trained to monitor and track changes in the nearshore ecosystem at all six Seattle marine reserves and Seahurst Park beach.

B. Aquatic Resources Master Stewardship Program. Citizens and businesses are recruited and trained to act as community stewards of creeks, shorelines, parks, beaches, and natural drainage systems. They will provide the community with technical assistance, lead community restoration efforts, and act as stewards of public property.

C. Community "Water Watchers" Education. Citizens in existing stewardship and naturalist programs can be further trained as "eyes, ears and educators" for creeks, lakes and shoreline areas and engaged in efforts to monitor and help protect their well being.

D. Citywide Community Environmental Action Guide. Citizens and businesses can receive a publication that will outline and unify a broader set of air-land-water environmental issues/impacts faced by the City along with community based actions which they can take to help in restoring the environmental health of Seattle.

E. Targeted 'Cleaning Up Our Act' Water Quality Public Information Campaign. Citizens and businesses can get information about alternatives to everyday activities in order to reduce adverse water quality impacts (e.g. cars, pet waste, pesticide use, and erosion/sediment).

F. Water Quality Pollution Prevention Workshops. Citizens and businesses can participate in workshops and get technical assistance to help them prevent pollution from entering our water bodies.

G. Targeted 'Slow the Flow' Public Information Campaign. Citizens and businesses can get information on actions to slow creek flows related to stormwater, thus preserving the quality of aquatic habitat in the creeks. This would be part of the Rainwise partnerships program below.

To build further partnerships, the Mayor's strategy also prioritizes City efforts to ***reduce regulatory disincentives*** by the following means:

H. Reduce regulatory disincentives. Work to identify and significantly lessen current regulatory disincentives and barriers for private property owners in undertaking restorative actions. Actions to focus on include, but are not limited to, the following:

- Work with the State to modify the 200-foot shoreline delineation for shoreline restoration projects and/or removing obstacles discouraging habitat restoration.
- Establish standard/pre-approved 'habitat friendly' plans for restoration of creek and shoreline areas.
- Offer technical assistance and habitat friendly construction guidelines for creek and shoreline restoration plans.
- Reduce the cost and time associated with the permit process when property owners propose to voluntarily restore shoreline and creek habitat.
- Encourage the use of shared docks, design of habitat friendly docks, and proposals to reduce over water coverage.
- Facilitate preservation of feeder bluffs as a source of new beach sand and gravel.

The Mayor's strategy also will ***provide financial incentives*** for actions that provide direct benefits to the City by, among other things, reducing the total amount of stormwater entering the City's drainage system and flowing to the City's streams, lakes and the Sound:

I. "Rainwise" – stormwater mitigation partnerships program. Encourage installation of rainwater cisterns, green roofs, and rain gardens, reduced impervious surfaces, and disconnection of downspouts where appropriate. This partnerships program will be guided by analysis and policy direction established in the 2005 Stormwater, Drainage and Grading Control Code Update. The incentive for these efforts will come in the form of technical assistance, materials and a possible reduction in drainage rates.

J. Natural Drainage System Local Improvement Districts (LIDs). Partner with property owners to establish LIDs for natural drainage system improvements. These self-imposed special taxing districts will be used to pay for amenities, such as sidewalks, that are ancillary to the function of natural drainage systems.

K. Plants Plus Program. Enter into agreements to provide property owners, who undertake a City approved habitat restoration effort, with appropriate native plants at low or no cost.

L. Habitat Restoration Grant and Technical Assistance Program. Match funds for community driven channel widening, flow control, water quality, fish barrier removal and creek habitat restoration efforts by setting aside at least $100,000 a year in funding for this purpose. This grant and technical assistance program would be administered through the Neighborhood Matching Fund (NMF) and would be in addition to existing NMF grants.

M. Habitat Related Property Tax Relief. Undertake a coordinated effort to enroll property owners in King County's Public Benefit Rating System in exchange for long term habitat restoration and protection, thereby providing the property owner with a property tax reduction and advancing City objectives for habitat restoration.

N. Conservation Easements Program. Work with non-profit groups and private property owners to place newly restored or currently pristine shorelines and creek properties into conservation easements.

ACTION ITEM #8. Advance Scientific Understanding and Adaptively Manage City Efforts.

While the science based investment guidelines outlined in Action Item #2 offer an excellent foundation for City efforts, Puget Sound, Lake Washington, and Seattle's urban creeks and lakes are extremely complex and dynamic environments. Additional investments in research will be necessary to advance scientific understanding of them and to assist the City in adaptively managing its restoration efforts. Below are the priority research efforts identified as part of the Restore Our Waters Strategy.

A. Creek Type/Classification Mapping

B. Water Quality Pollution Source Investigation and control strategy for listed pollutants in creeks and receiving water bodies

C. Coho Pre-Spawn Mortality Investigation Land Use analysis

D. City Critical Habitat and Habitat Condition Mapping

E. Lake Union/Ship Canal Habitat Areas and Fish Use

F. Sediment Recruitment and Transport in Lake Washington

G. Sediment Recruitment and Transport in Puget Sound Marine Near-Shore

H. City Wetland Mapping

ACTION ITEM #9. Establish a Stakeholder Group to Promote Long-Term Coordination within City Government and Among the Citizens of Seattle.

At the heart of this strategy is an effort to establish better coordination between City departments and to ensure stakeholder involvement to help guide the City's actions to foster healthier waters over the long-term. To assist with this effort, the Mayor is forming two groups: an internal Restore Our Waters (ROW) team and an external Stakeholder Advisory Group.

The internal ROW Team will provide analytical support to the external Stakeholders Advisory Group and ensure Department actions are aligned with the City's aquatic restoration and protection goals. The Team will:

- Recommend and review aquatic resource related updates to City plans and Code.
- Promote the integration of Restore Our Waters action items into annual budgets and Capital Improvement Plans (CIPs).
- Act as a clearinghouse to broker agreements between departments and resolve conflicts between City policies and the objectives of this strategy.
- Work to leverage City investments with outside sources and coordinate related grant applications across Departments.
- Elevate policy conflict to the Mayor's sub-cabinets for resolution.

The external Stakeholder Advisory Group will consist of scientific professionals, business and industrial community representatives, environmental and community interests, and representatives from relevant City committees and commissions. The Stakeholder Advisory Group will act as an advisory body informing high level policy, regulatory, and annual budget decisions related to water resources.

This group will also serve as a central connecting point for the active community based watershed councils and groups that provide the local knowledge base and activism focused on Seattle's water resources. These groups include, but are by no means limited to: Carkeek Watershed Community Action Project, Fauntleroy Watershed Council, People for Puget Sound, Pipers Creek Watershed Council, Puget Soundkeepers Alliance, Thornton Creek Alliance and YES for Seattle.

By establishing these teams, the Mayor seeks to ensure that the Restore Our Waters strategy will benefit from public input, but more importantly that it will become an ingrained feature of how the City operates.

RESTORE OUR WATERS – NEXT STEPS AND SEATTLE 10 YEARS HENCE

During the next biennium the Mayor will begin to implement the action items and recommendations of this report. The City will advance this strategy's priority capital projects and will apply its science-based guidelines to identify other capital projects where the City can restore our waters. The City will develop amendments to the City codes that will remove disincentives to property owners taking action on their property to improve water resources.

Additionally, the City will create regulatory frameworks for increasing the effectiveness of mitigation in industrial areas and will incorporate this strategy's principles into updates of its Comprehensive Plan, Stormwater Code, and other policy and regulatory documents. The City also will begin to develop the education and community programs outlined in this document, and create incentive programs to

encourage property owners to restore their shorelines and creeks. Finally, the City will work to expand its scientific understanding of these areas, critical impacts to them and potential solutions for addressing these impacts. As this understanding grows, the City will move to adapt its efforts accordingly.

This strategy's recommended actions will have different emphases in different aquatic areas. Results will be more immediately evident in some areas and take longer in other areas. Here is a look at what the Mayor expects to see underway in the next 10 years**.**

Duwamish River, Lake Union, Portage Bay, and the Ship Canal/Ballard Locks

Regulatory Changes, Capital Projects and Operational Improvements. Over the next ten years the City of Seattle and other responsible parties under Superfund will undertake sediment remediation projects on both the Duwamish River and in Lake Union. While the cost of these projects is yet to be determined, they will likely amount to tens of millions of dollars. On both the Duwamish and Lake Union private property owners will make significant investments in habitat restoration in the coming years as a result of regulatory requirements that are part of the sediment cleanups. The City is working on developing regulatory frameworks that will allow the most effective habitat investments in these important industrial areas.

In the Duwamish, the City will invest about $3 million to address water quality issues in the South Park and Norfolk drainage basins. Concurrent with these investments the City is also increasing industrial source control inspection and enforcement to stop discharge of hazardous materials before it occurs.

In Lake Union, the City intends to make a number of investments to improve water quality of the Lake and Ship Canal. The most significant investment is the continued effort to reduce CSOs on Lake Union and the Ship Canal. In addition the Seattle Department of Transportation will conduct a preliminary engineering study to identify ways to better contain and treat stormwater from the Ballard Bridge and, in the future, other bridges spanning this waterway.

Overall, these areas will benefit from City water quality investigations and targeted source control strategies for its receiving water bodies. They will also benefit from BMP pilots related to targeting street sweeping and drainage and CSO infrastructure maintenance.

To improve conditions for migratory fish, the City intends to collaborate with the Army Corp of Engineers on evaluating the development of a more natural estuary by the Ballard Locks. This is a long term effort to study the potential of constructing a bypass around the locks that would function like an estuary, and would allow juvenile and adult salmon to more gradually acclimate as they travel between fresh and saltwater. The City will also work with the Army Corp of Engineers to conduct an assessment of ways to facilitate greater salt-water intrusion at the Locks.

Partnership Programs. Because of the industrial nature of the areas immediately surrounding the Duwamish, Lake Union and Ship Canal, incentive programs that can be accessed by businesses have the most potential. Commercial and industrial property owners may have an interest in enrolling in the stormwater mitigation program, particularly if they receive a stormwater rate reduction for the installation of cisterns and other stormwater retention technology. To the extent that incentive programs geared toward residential property owners reduce overall stormwater runoff in these areas, they will also help improve water quality by reducing CSOs and the general volume of water draining to these water bodies.

Water quality pollution prevention workshops and a technical assistance guide to businesses and property owners will provide valuable information to businesses interested in reducing their impact on these water resources. This is also true of a City Community Environmental Action Guide. While neither of these guarantee modifications in behavior, they will provide businesses that wish to change their practices with valuable technical information on how they can reduce their impact on the aquatic environment.

Puget Sound Shoreline/Elliot Bay

Capital Projects and Operational Improvements. Over the next ten years the City will invest several million dollars on shoreline restoration projects in conjunction with replacement of the Alaskan Way seawall. While the exact nature of those projects is yet to be determined, the City is prepared to restore some portion of the shoreline in Elliot Bay to create shallow water intertidal habitat for juvenile salmon.

Additionally, the City will fund a major shoreline restoration project in Salmon Bay adjacent to the Ballard Locks. This project calls for shoreline restoration, revegetation and subsequent removal of several overwater structures. An adjunct to this project is an investigation into opening the mouth of Wolfe creek, and restoring a length of shoreline stretching from Commodore Park to the Burlington Northern Railroad bridge.

The City will also conduct a targeted study of areas that are suitable for shallow water habitat and bulkhead removal along the Marine Nearshore, such as Alki, Myrtle Edwards Park, Puget and Fairmont Creeks. These areas will also benefit from targeted street sweeping and drainage and CSO infrastructure maintenance BMP pilots.

Partnership Programs. The City has an interest in restoring shoreline areas and creating shallow intertidal habitat. Along the Puget Sound shoreline, particularly the area stretching from Elliot Bay north, there are many private properties. There may be opportunities to restore some of these properties to eliminate bulkheads and create natural beaches. Private property owners could offset the cost of that work by enrolling in the County's Public Benefit Rating System – something the City will help them investigate. Property owners could also mitigate their property tax costs by placing some of the property in a conservation easement, which the City would work with non-profits to facilitate. Additionally, to reduce the cost of restoration work the property owner(s) could acquire some of the native plants for the restoration work from the City's proposed "Plants Plus" program, which will provide property owners who are undertaking habitat restoration efforts with appropriate native plants at low or no cost.

All of the education and outreach programs and enhancements proposed as part of this strategy will also help protect our Puget Sound shorelines. However, one of the programs, the Citizen Science Program, is designed specifically to teach citizens about the marine nearshore and the complex ecology of this area. Additionally, the Aquatic Resources Master Stewardship program will be integrated with other existing stewardship programs, including the Beach Naturalist program, and will provide an added element of community organizing and outreach specific to this particular resource area.

Lake Washington/Union Bay

Capital Projects and Operational Improvements. The City of Seattle owns significant amounts of property along the shoreline of Lake Washington, both at the major parks and along Lake Washington Boulevard. As part of the Mayor's strategy the City has identified ten shoreline restoration projects on Lake Washington, with four of them along Lake Washington Boulevard. The balance of the projects will take place at Rainier Beach, Sand Point Magnuson, Seward, Beer Sheva, and Martha Washington Parks.

To address water quality issues in Lake Washington, the Mayor has identified several CSO projects as priorities for funding in the next ten years. However, of critical importance to improving water quality in Lake Washington is roughly $5 million in planned maintenance and upgrades on CSO outfalls in the Gennessee/Henderson recreational areas, and conducting focused maintenance on a set of CSO's in the Madrona/Leschi area that are prone to summertime overflows. Overall, these resources will also benefit from City research into water quality investigations and targeted source control strategies for its receiving water bodies.

Partnership Programs. Because of the size of the area that drains to Lake Washington, all of the proposed outreach and education programs will have a positive affect on the water quality in the lake. Of particular relevance to Lake Washington because of the number of City parks adjacent to the lake, is the outreach program to educate the public about pet waste and reduce the introduction of fecal coliform to the lake. Also, incentives that inspire private property owners to remove or reduce bulkheads and restore a natural shoreline edge to their properties will be particularly important.

Urban Creeks

Capital Projects and Operational Improvements. This strategy advances a number of projects to improve the quality of Seattle's urban creeks. Among the most critical are four natural drainage system projects, which will help improve water quality and reduce peak flow stormwater runoff to Thornton, Longfellow and Pipers Creeks. Additionally, the Mayor is recommending that the City undertake a watershed based flow control investigation, which will identify high impact drainages in each of Seattle's five salmon-bearing creeks, and suggest flow control measures the City can undertake to reduce flows. Approximately $1.2 million has been earmarked for investigation and preliminary engineering and $8 million dollars over the next 5 years for implementation of these flow control projects.

Additionally, the City will begin to assess and facilitate channel widening and related habitat restoration options at select locations along creek corridors. Because large reaches of Seattle's creeks are on or adjacent to private property, these projects would likely be undertaken by private property owners. Overall, these areas will benefit from City research into the water quality investigations and targeted source control strategies. They will also benefit from water quality BMP pilots related to targeting street sweeping and drainage and CSO infrastructure maintenance. The City will also undertake a BMP pilot to work with community members to reduce fecal contamination of creeks – this will involve outreach, monitoring, public education, and providing the public with waste collection bags and containers at targeted locations. The City will continue working on the coho pre-spawn mortality investigation and water quality monitoring on creeks that run through the City's municipal golf courses. On Thornton Creek, the City will also invest in the $6.8 million water quality project on the South Lot at Northgate.

This strategy also proposes several fish passage barrier removal projects. On Taylor Creek, the City will remove two fish passage barriers, one at Rainier Avenue South and another immediately upstream. On Longfellow Creek, the City will remove three barriers at the West Seattle Golf Course, at an approximate cost of $2.7 million. Additionally, as part of the Mayor's Green Seattle Initiative, City Departments will also commit approximately $300,000 a year and work with other partners to reforest riparian and forest areas in the City.

Partnership Programs. The greatest adverse impact on Seattle's urban creeks, high peak flows and poor water quality, are generated by water from drainage basins that are often many square miles in size. To make headway in reducing these flows it is essential to enlist the aide of private property owners, even those far from the banks of creeks. The City will offer incentive programs to educate and encourage citizens to modify their homes or property to detain more stormwater. This program will encourage installation of rainwater cisterns, green roofs, and rain gardens, reduced impervious surfaces, and disconnect downspouts where appropriate. In exchange for making these improvements the property owner will receive technical assistance, materials and a possible reduction in drainage rates. The City will also partner with property owners to establish Local Improvement Districts (LIDs) to fund some portions of natural drainage system projects in their neighborhoods.

The City also intends to undertake a targeted public information campaign focused on reducing adverse water quality impacts (e.g. cars, pet waste, pesticide use, erosion/sediment) and hold water quality pollution prevention workshops and provide technical assistance to businesses and property owners. These activities will be augmented by a City Community Environmental Action Guide developed to outline and unify a broader set of air-land-water environmental issues/impacts faced by the City along with community based solutions.

To help faciliate these and other private sector efforts along creeks, a habitat restoration grant program will be available to match community driven channel widening, flow control, water quality, fish barrier removal and creek habitat efforts. This grant will be administered through the Neighborhood Matching Fund (NMF) and be provided in addition to existing NMF grant funding opportunities. Owners of property adjacent to a creek who wish to undertake restoration work on their property could also receive assistance from the Plants Plus program, enrolling their property into a the Public Benefit Rating System to reduce taxes, and by using pre-approved landscape design and restoration plans.

Inland Lakes – Green, Bitter and Haller Lakes

Capital Projects: The City's capital investments for in-land lakes are largely intended to address water quality. Approximately $5.8 million has been earmarked over the next five years for water quality investments in the Densmore Drainage basin leading to these lakes and to specifically address sediment accumulation issues at Bitter Lake. This strategy would also supports continued periodic investments in alum treatment for Green Lake to prevent blue-green algal blooms.

Partnership Programs: Green Lake is within a City park, but both Haller Lake and Bitter Lake have significant private ownership. Incentive and other partnership programs will help interested property owners return their shoreline edges to more natural conditions, providing better habitat for fish and birds. Additionally**,** all three small lakes will benefit from education programs directed at increasing water quality stewardship programs that will improve the quality of the riparian edges on both public and private lands.

IN CONCLUSION

The Mayor hopes that the City's actions generate a momentum that will fundamentally change how we as a City view these critical resources, but more importantly will support citizens efforts to ROW or (restore our waters) together to make the City's aspirations for each of these resource areas a reality. Hopefully, this strategy will spark long-term commitments from the City, property owners and others that will benefit not only our children, but also their children's grandchildren.

THIS IS A PROPOSED STRATEGY THAT WILL EVOLVE OVER TIME.
TO PROVIDE FEEDBACK, or inquire about next steps , PLEASE:

- Write a letter or send an e-mail to Mayor Nickels. Go to www.seattle.gov/mayor to find out how to contact the Mayor.
- Contact the Mayor's Office of Sustainability and Environment at (206) 615-0817 to sign up for the Mayor's quarterly brown bag lunches on environmental issues.
- Contact Danielle Purnell at Seattle Public Utilities - (206) 233-7246 or danielle.purnell@seattle.gov.
- Connect with this Strategy's Stakeholders Advisory Group once it is formed.

APPENDIX ONE
Action Plan - timeframes, funding, funding status and responsible departments

#1. Establish Long-Term Aspirations for In-City Water Resources. (See Action Item #4A)			
#2. Use Science Based Guidelines to Direct Citywide Efforts. (See Action Item #4A)			
#3. Establish Clear, Quantifiable Goals and Measures of Progress. (See Appendix 3 for detailed monitoring commitments)			
ACTION ITEM	**Timing**	**Funding Status**	**Responsible Depts.**
A. Develop Quantifiable Goals	2005-2007	TBD	SPU, DPR, DPD, OSE
B. Issue First "State of the Waters" Report	2006	TBD	SPU, DPR, DPD, OSE
#4. Make Strategic Changes to the City's Policy and Regulatory Framework.			
ACTION ITEM	**Timing**	**Funding Status**	**Responsible Depts.**
A. Formalize Aspirations and Guidelines	2004	N/A	Mayor's Office
B. Major Regulatory Updates	2004-2009	N/A	DPD, SPU
C. Regulatory Frameworks Shoreline/Duwamish	2004-2005	TBD	OED, DPD, SPU, SCL
D. Reconcile Policy Conflicts	2005-2007	TBD	All Depts.
E. Uniform Planning and Compliance Review	2005-2006	N/A	All Depts.
F. Targeted Code Enforcement	2005-2008	TBD	SPU, DPD, DPR
#5. Move Forward on Priority City Capital Project Investments. (See Appendix 5 for project specific commitments)			
#6. Make Investments to Ensure City Operations Support Improved Aquatic Health.			
ACTION ITEM	**Timing**	**Funding Status**	**Responsible Depts.**
A. Targeted Street Sweeping Catch Basin Pilot	2005-2006	Funded	SDOT, SPU
B. Fecal Coliform Pilots	2005	Funded	DPR, SPU

C. Targeted CSO, Drainage Infrastructure Pilots	2005-2006	Funded	SPU
D. Pesticide Use, Turf Health, Monitoring Golf Course Pilot	2006	Unfunded	DPR
E. Construction Management Practices Pilot	2006	Unfunded	OSE, SPU, DPR, SCL
#7. Expand Partnerships with the Community and Private Property Owners to Restore Our Waters.			
ACTION ITEM	**Timing**	**Funding Status**	**Responsible Depts.**
A. Citizens Science Program	2005	Pending	DPR
B. Aquatic Resources Master Stewardship Program	2006	Unfunded	SPU, DPR
C. Community Water Watchers Education	2006	TBD	SPU, DPD, DPR
D. City-wide Community Environmental Action Guide	2004-2005	Funded	OSE
E. Targeted 'Clean up Our Act' Water Quality Information Campaign	2006	Unfunded	SPU
F. Water Quality Pollution Prevention Workshops	2006	Unfunded	SPU
G. Targeted 'Slow the Flow' Information Campaign	2006	Unfunded	SPU
H. Remove Regulatory Disincentives	2006	TBD	DPD, SPU, OIR
I. Rain-wise Stormwater Mitigation Partnerships Program	2005	Funded	SPU
J. Natural Drainage System Local Improvement Districts (LIDs)	2004	Funded	SPU
K. Plants Plus Program	2006	Unfunded	SPU, DPR
L. Habitat Restoration Grant and Technical Assistance	2005	Funded	SPU, DON
M. Habitat Related Property Tax Relief	2005	TBD	SPU, DPR, DOF
N. Conservation Easements Program	2006	Unfunded	SPU, OSE, DPR

#8. Advance Scientific Understanding and Adaptively Manage City Efforts			
ACTION ITEM	**Timing**	**Funding Status**	**Responsible Depts.**
A. Creek Type/Classification Mapping	2005	N/A	SPU
B. Water Quality Pollution Source Investigation and Control Strategy	2005-2006	Funded	SPU
C. Coho Pre-Spawning Mortality Investigation	2004-2005	Funded	SPU
D. City Critical Habitat and Habitat Condition Mapping	2006	Unfunded	SPU, DPD
E. Lake Union/Ship Canal Habitat Areas and Fish Use	2005	Unfunded	SPU, DPD, OED
F. Sediment Recruitment and Transport Lake Washington	2007-2008	Unfunded	SPU, others
G. Sediment Recruitment and Transport Puget Sound Marine Near Shore	2004-2006	TBD	King County, SPU
H. City Wetland Mapping	2005	Funded	DPD
#9. Establish a Stakeholder Group to Promote Long-Term Coordination within City Government and Between the citizens of Seattle.			
ACTION ITEM	**Timing**	**Funding Status**	**Responsible Depts.**
A. Establish ROW Team	2004	N/A	Mayor's Office
B. Establish Stakeholder Advisory Group	2004	N/A	Mayor's Office

Departmental Key :
DOF – Department of Finance
DON – Department of Neighborhoods
DPD – Department of Planning and Development
DPR – Department of Parks and Recreation
F&F – Department of Fleets and Facilities
OED – Office of Economic Development
OIR – Office of Intergovernmental Relations
OSE – Office of Sustainability and Environment
SCL – Seattle City Light
SDOT – Seattle Department of Transporation
SPU – Seattle Public Utilities
SCL – Seattle City Light

APPENDIX TWO
Summary of Current State Conditions for Seattle's Aquatic Environments

Aquatic environments depend upon clean water and sediments; controlled stormwater flows (for creeks); strong land water connectivity; and habitat complexity to provide healthy habitat for fish and wildlife and safe and inviting recreational opportunities for people. Evidenced by general conditions described in Table 1 below, Seattle aquatic environments are considered degraded.

Table 1
General Condition of Seattle's Aquatic Environments

Marine Nearshore/Duwamish/Lake Washington/Lake Union/Ship Canal
• Water Quality issues include fecal coliform, ph, dissolved oxygen, temperature. Occasional beach closures due to fecal coliform.
• Sediment contamination found in the vicinity of some outfalls and historic industrial areas. Contaminant range from PCB's, metals, oil, bioassay, pesticides, to organics.
• Majority (over 90%) of shoreline is armored with little riparian vegetation.
• Reduced beach sand and gravel recruitment due to the high amount of bank armoring.
• Significant numbers of over-water structures (piers and docks).
• Non-native plant and fish species.
• Lack of backshore and estuarine environments providing adequate salt and freshwater transition for migrating salmon
• Small amount of intertidal mudflat, limited wetlands and shallow water habitat – areas that serve as rearing zone for salmon and foraging fish.
• Limited biological organisms.
Urban Creeks
• Creeks experience high (torrential) flow volumes and velocities from storm water runoff.
• High flows erode (scour) banks and streambed resulting in creek channels that are confined and incised.
• Little substrate and too much fine sediment to support biological communities, spawning and rearing.
• Little or no cover or flow refuge for fish.
• Water quality issues include fecal coliform, oil, dissolved oxygen, and metals. Oil and pesticides in streambed sediment.
• Creek banks, to varying degrees, are armored, preventing connection with the surrounding floodplain.
• Most small creeks have been piped into offshore areas, with no natural creek mouths.
• Significant numbers of fish passage barriers prevent access to large reaches of creeks, varying from 50% to 90%.
• Poor riparian conditions due to yards, buildings, few trees, and non-native vegation.
• Salmon bearing creeks experience 25% to 90% of adult coho pre-spawn mortality. Cause unknown.
• Limited biological organisms.
In-land Lakes
• Relatively good water quality. Green Lake is an exception, characterized by high phosphorous levels and resulting algae blooms.
• Sediment accumulations from outfalls.
• Mixed riparian vegetation.
• Good habitat for non-native species (milfoil and bass) – poor habitat for trout.

In the Puget Sound, Duwamish, Lake Washington, and Lake Union/Ship Canal lack of shoreline refuge areas and water and sediment quality problems present the most significant limiting factors to aquatic health. Lack of shoreline refuges has been the result of extensive development and bank armoring (e.g bulkheads, riprap, seawalls, etc) along Seattle's shoreline areas. These impacts have reduced sediment recruitment, degraded shallow water habitat, and reduced riparian vegetation and associated wildlife. Water and sediment quality problems are the result of historic contamination, industrial/manufacturing operations, stormwater runoff from roads, yards, storm drain and combined sewer outfalls.

In Seattle's urban creeks, high impact stormwater flows (velocities and volumes) and water quality problems are the most significant limiting factors to these systems. High impact stormwater flows are the result of high levels of impervious surfaces and uncontrolled runoff from urban developments occurring prior to Seattle's stormwater code. High impact flows have simplified, deepened and narrowed creek channels and washed out their structure (sediment, wood) creating the equivalent of a flume. Water quality problems are the result of stormwater runoff from roads and yards, pet and wildlife wastes, and combined sewer system overflows.

For in-land lakes, sediment and other pollutant loading and non-native species, while generally not considered severe, are the biggest limiting factors to these systems. These issues are the result of stormwater runoff from roads, yards and City outfalls, lack of fresh water sources, extensive development and natural processes.

APPENDIX THREE
State of the Waters - Monitoring Strategies and Commitments.

In collaboration with others, the City will monitor baseline conditions and trends in Seattle's aquatic environments and report biennially (or as necessary) on the following:

1. Improvements in Water Quality

- The City (in collaboration with others) will monitor selected, priority pollutants in receiving water bodies and specific areas of interest (including selected outfalls and public contact recreation areas).
- CSO overflow volumes and events will be monitored including frequency and volume of summer weather overflows near public contact recreation areas and into Lake Union/Ship Canal.
- Frequency and duration of beach closures will be reported.
- Pre and post project measurements will be conducted on selected projects to assess the impact of City investments and targeted BMP's on improving water quality.
- Capital project, regulatory and programmatic results focused on improvement water quality (e.g. # of infrastructure projects, # workshops conducted, attendance, # of private water quality vaults required/installed) will be reported on.

2. Reductions in High Impact Creek Flows

- The City will monitor both baseline and defined high impact creek flows (based upon volume, velocity, frequency and duration) in selected creek basins.
- Pre- and post- project measurements will be conducted on selected projects (i.e. natural drainage systems) to assess the impact of City investments in reducing flows in selected basins.
- Capital project, regulatory and programmatic results focused on reducing flows (e.g. # of infrastructure projects; # of rain barrels issued, # of private detention vaults required/installed) will also be reported.

3. Increases in Critical Habitat (Connectivity and Complexity)

- The City will report on the extent and % of armored vs. natural shorelines within the City (including creeks) and ownership patterns related to that shoreline.
- The extent and quality (e.g. native vs. invasive) of riparian and shoreline vegetation.
- Pre- and post project measurements will be conducted on selected habitat projects (e.g. plant survival rates, fish returns, etc) to assess the impact of City investments.
- Capital project, regulatory and programmatic results focused on enhancing habitat (e.g. # of shoreline restoration projects, shoreline regulatory actions, fish passage projects, riparian reforestation projects, etc) will be reported on.
- In partnership with others, periodically assess in-City aquatic species health and abundance by reporting on factors and changes in things such as: adult salmon returns at the Locks, in the Duwamish and spawning surveys on salmon bearing creeks; smolt trappings at key refuge points (e.g. Mapes, Rainier Beach, Herrings House) and on salmon bearing creeks; coho pre-spawn mortality on salmon-bearing creeks; benthic biodiversity at key refuge points and on salmon-bearing creeks and bird diversity and populations at key refuge points.

4. Increases in Partnerships and Leveraging

- The magnitude and percentage by which City investments in aquatic ecology have been matched or leveraged by grants and other outside funding sources and in-kind commitments will be reported on.
- The number of volunteers active in stewardship of shorelines, beaches, creeks and natural drainage systems will be reported on.

- Matching fund grants, rate/fee reductions, technical assistance and other incentives will be reported on.
- Number of privately initiated and City approved restoration activities will be reported on.
- City dollars and efforts spent to educate and engage the public related to aquatic resource protection in the City will be reported on.

Table 1 below outlines City funding commitments for key components of this monitoring strategy.

Table 1
City's Key Monitoring Commitments – Seattle Aquatic Environments

Comprehensive Water Quality Monitoring Program[1, 2]
Regulatory Compliance and/or Support Monitoring (e.g. NPDES, TMDL, etc.) – ($420,000/Funded)
Natural Drainage System Water Quality Monitoring (e.g. Broadview, Highpoint, etc.) – ($400,000/Funded)
Targeted Water Quality Monitoring (e.g. temperature, B-IBI, etc.) – ($15,000 per year/Funded)

Flow Monitoring Program
Drainage and Wastewater Flow Monitoring System Upgrade – ($760,000/Funded)
City-wide Flow Monitoring (e.g. NDS, Creeks, CIP performance evaluation) – ($200,000 per year/Funded)
CSO Capital Flow Monitoring – ($400,000 per year/Funded)
CSO Compliance Monitoring – ($350,000 per year/Funded)
Drainage and Wastewater Operations Monitoring (SCADA pump stations) – ($116,000 per year/Funded)
Greenwood Peat Bog (monitoring of stormwater system) – ($200,000/Funded)
South Lake Washington Sewer Main Assessment – ($100,000/Funded)
Highpoint Monitoring – (DOE Centennial Grant $72,000)
Decentralized Wastewater Management – (EPA Grant $100,000)

Habitat Monitoring Program
Post-CIP Creek Monitoring (Creek Monitoring Team) – ($75,000 per year/Funded)
Large Woody Debris (LWD) Survey (physical integrity)– ($15,000/Funded)
Spawning Surveys – ($68,000 per year/Funded)
Seward Park Substrate Enhancement – ($6,000 per year/Funded)
Beer Sheva/ Mapes Creek Fish Use – ($2,500 per year/Funded)
Rainier Beach Lake Park and Marina Fish Use – ($2,500 per year/Funded)
Salmon Bay Natural Area (Invertebrates and Fish Use) – ($35,000 per year/Unfunded)
Urban Creek Watershed Assessment Study – ($12,000 in 2007/Unfunded)
Large Woody Debris (LWD) Survey (biological integrity) – ($60,000/Unfunded)
Coho Pre-spawn Mortality Monitoring – ($30,000 per year/Unfunded)
Smolt Trapping – ($8,000 per year/Unfunded)
Sediment Budget Monitoring – ($20,000 per year/Unfunded)
West Nile Virus – ($20,000 per year/Funded)

Note: Items that will be monitored and reported on by another agency and/or that will require little staff time and funding to assemble are not reflected in this list. (e.g. # matching fund grants awarded, # of grants received, # of shoreline regulatory actions, # of adult salmon returns at the Locks, # and duration of public beach closures).

1. Not including Duwamish Superfund and Gasworks
2. Staff labor not included

APPENDIX 4
City Plans, Policies, Regulations and Regulatory Requirements Related to Aquatic Environments

The City's regulatory requirements as well as its own policy and regulatory frameworks governing aquatic environments are extensive and include:

- **Urban Blueprint for Salmon Recovery** *outlining early actions to address the Chinook Salmon Threatened Species Listing. (Federal Endangered Species Act – National Oceanic and Atmospheric Administration)*

- **City's Comprehensive Plan** and its environmental and land use elements with relevant policies. (*Growth Management Act – Washington Office of Community Trade and Economic Development - CTED)*

- **Seattle Environmentally Critical Areas Ordinance** containing regulations intended to protect and enhance aquatic environments. *(Growth Management Act -CTED)*

- **Shoreline Master Program** with its policies for land use and environmental protection in shoreline areas. *(Shoreline Management Act – Washington State Department of Ecology - DOE)*

- **Stormwater Grading and Drainage Control Ordinance** with its stormwater flow control and pollutant source control requirements for development. *(Municipal Stormwater National Pollutant Discharge Elimination System NPDES Permit 1995 – Federal Clean Water Act – DOE)*

- **Comprehensive Drainage Plan** with its policy and programmatic framework describing City actions related to stormwater management, creek drainages and NPDES permit related water quality monitoring and education requirements.

- **Combined Sewer Overflow Reduction Plan** to control overflows. *(Combined Sewer Overflow National Pollutants Discharge Elimination System Waste Discharge Permit No. WA-003168-2 – Federal Clean Water Act – DOE)*

- **SEPA Ordinance** with its environmental review requirements. *(Washington State Environmental Policy Act SEPA - DOE)*

- **Citywide Environmental Management Program and Environmental Action Agenda** including environmental policies, procedures, performance monitoring, and action items governing the work of City departments.

- **Lower Duwamish Sediment Cleanup** *(*Comprehensive Environmental Response, Compensation, and Liability Act CERCLA *-Environmental Protection Agency EPA- DOE)*

- **Lake Union-Gasworks Park Sediment Cleanup** *(Model Toxics Control Act MTCA - DOE)*

APPENDIX 5
Priority Capital Investments

Project Description	Total Funds 2004-2014*	Time Frame	Lead Dept.	Status
Citywide – Creeks				
• Riparian Reforestation Partnerships	1,500	Short	SPU/ DPR	Funded
• Channel Widening and Related Habitat Restoration Assessments	300	Long	SPU	Funded
• Creek Flow Control Strategies Watershed Based Investigation -Focus High Impact Basins	1,263	Mid	SPU	Funded
• Creek Flow Control Strategy Implementation (natural drainage, detention, bypass, etc)	8,000	Long	SPU	Funded
Sub-Total:	11,063			
Duwamish River				
• Sediment Remediation – Duwamish	TBD	Long	SCL/SPU	Funded
• Water Quality Improvements Duwamish – Norfolk basin	1,480	Mid	SPU	Funded
• Water Quality Improvements Duwamish – South Park basin	1,480	Mid	SPU	Funded
Sub-Total:	2,960			
Inland Lakes				
• Green Lake Alum Treatment & Monitoring	1,500		DPR	Funded
• Bitter Lake Water Quality Improvements (Sediment Dredging)	410	Mid	SPU	Funded
• Bitter Lake Water Quality Improvements (Stormwater Vaults)	2,662	Mid	SPU	Funded
• Water Quality Improvements In-Land Lakes/Lake Union – Densmore basin	2,805	Mid	SPU	Funded
Sub-Total:	7,377			
Lake Union/Ship Canal				
• Bridge Stormwater Treatment Assessment	150	Mid	SDOT	Unfunded
• CSO – Ballard	1,092	Long	SPU	Funded
• CSO – Fremont/Wallingford	1,888	Mid	SPU	Funded
• Saltwater Intrusion at the Ballard Chittenden Locks – Assessment	150	Long	SPU/ Army Corp	Unfunded
• Sediment Remediation - Gas Works Park Shoreline	TBD	Long	SPU	Funded
Sub-Total:	3,280			
Lake Washington				
• CSO – Genessee Project	4,569	Long	SPU	Funded
• CSO – Henderson Poject	3,947	Long	SPU	Funded
• Shoreline Restoration - Beer Sheva Enhancement/Mapes Creek Mouth Daylighting	265	Short	SPU/ DPR	Funded

• Shoreline Restoration – Martha Washington Park Phase 1 and 2.	350	Short	DPR	Funded
• Shoreline Restoration – Sand Point Magnuson Park Northshore	2000	Short	DPR	Funded
• Shoreline Restoration – Rainier Beach Lake Park	550	Short	DPR	Unfunded
• Shoreline Restoration – Lake WA Blvd./Madrona Drive.	350	Mid	DPR	Unfunded
• Shoreline Restoration – Lake WA Blvd/McClellan Street	1000	Mid	DPR	Unfunded
• Shoreline Restoration – Lake WA Blvd/S. Adams St. Renourishment	75	Mid	DPR	Unfunded
• Shoreline Restoration – Lake WA Blvd/S. Alaska St. Substrate Enhancement	85	Mid	DPR	Unfunded
• Shoreline Restoration – Seward Park Nearshore Substrate Enhancement	150	Mid	DPR	Unfunded
Sub-Total:	13,341			
Longfellow Creek				
• Natural Drainage System - High Point	3,895	Mid	SPU	Funded
• Fish Barrier Removal –WSGC 12th Fairway culvert, WPA dam, culvert downstream of SW Brandon Street	2,750	Mid	DPR	Unfunded
Sub-Total:	6,645			
Pipers Creek				
• Natural Drainage System – Broadview Green Grid	1,701	Mid	SPU	Funded
• Natural Drainage System – Venema Creek	4,265	Mid	SPU	Funded
Sub-Total:	5,966			
Puget Sound				
• Shoreline Restoration – Salmon Bay Natural Area Phase 1 (revegetation) and 2 (overwater structures)	275	Short	DON	Funded
• Shoreline Restoration - Facilitate feasibility study for natural estuary at the Ballard Locks	150	Long	SPU/ Army Corp	Unfunded
• Shoreline Restoration – Commodore Park to Railroad Bridge/Daylight Wolfe Creek Mouth	600	Long	DPR/ SPU	Unfunded
• Shoreline Restoration – Alaska Way Seawall – Elliot Bay shoreline habitat improvements	TBD	Long	SDOT/ SPU	Unfunded
• Shoreline Restoration – Feasibility study for bulkhead removal and shoreline restoration. (Including Alki, Fairmont Creek, Puget Creek, Myrtle Edwards Park)	TBD	Mid	SPU/DPR	Unfunded
Sub-Total:	1,025			
Taylor Creek				
• Shoreline Restoration – Facilitate removal of submerged woodpile at the mouth of Taylor Creek.	75	Short	DPR, SPU	Unfunded
• Fish Barrier Removal - At Rainier Ave and Immediately upstream	625	Mid	SPU	Funded
Sub-Total:	700			

Thornton Creek				
• Natural Drainage System – Pinehurst	4,358	Mid	SPU	Funded
• Northgate Water Quality Project(s)	6,818	Mid	SPU	Funded
Sub-Total:	11,176			
Total:	**63,533♦**			

Costs in thousands of dollars

♦ Does not include Projects with costs To Be Determined (TBD)

Lead Department Abbreviations

DPR - Department of Parks and Recreation
SPU - Seattle Public Utilities
SDOT - Seattle Department of Transportation
DON – Department of Neighborhoods
SCL – Seattle City Light
Army Corp - U.S. Army Corp of Engineers

Time Frame

Short Term - 1 to 2 years
Mid Term - 3 to 5 years
Long Term - 5 to 10 years